

## ABSTRACT OF THE DISCLOSURE

A phase locked loop type frequency synthesizer utilizing a reference  
5 signal source includes a voltage controlled oscillator (VCO), a phase  
comparator, a programmable pre-scaler and a modulator. The programmable  
pre-scaler divides the output of the VCO according to a sequence of divide  
ratios to produce a divided signal having a frequency approximating the  
reference signal frequency. The phase comparator compares the phases of the  
10 divided signal and the reference signal and, in response to a difference, adapts  
the VCO to reduce the detected difference. The modulator provides a next  
value in the sequence of divide ratios by accumulating an error between a  
present value and an average value in the sequence of divide ratios,  
accumulating the accumulated error values, and determining the next value in  
15 the sequence of divide ratios such that the multiply-accumulated error values  
are maintained within finite bounds.